Final project report

1. Format of a published paper
2. hand in by June 3 (Friday)
3. 5-minute oral powerpoint presentation (June 3 and 6 ?)

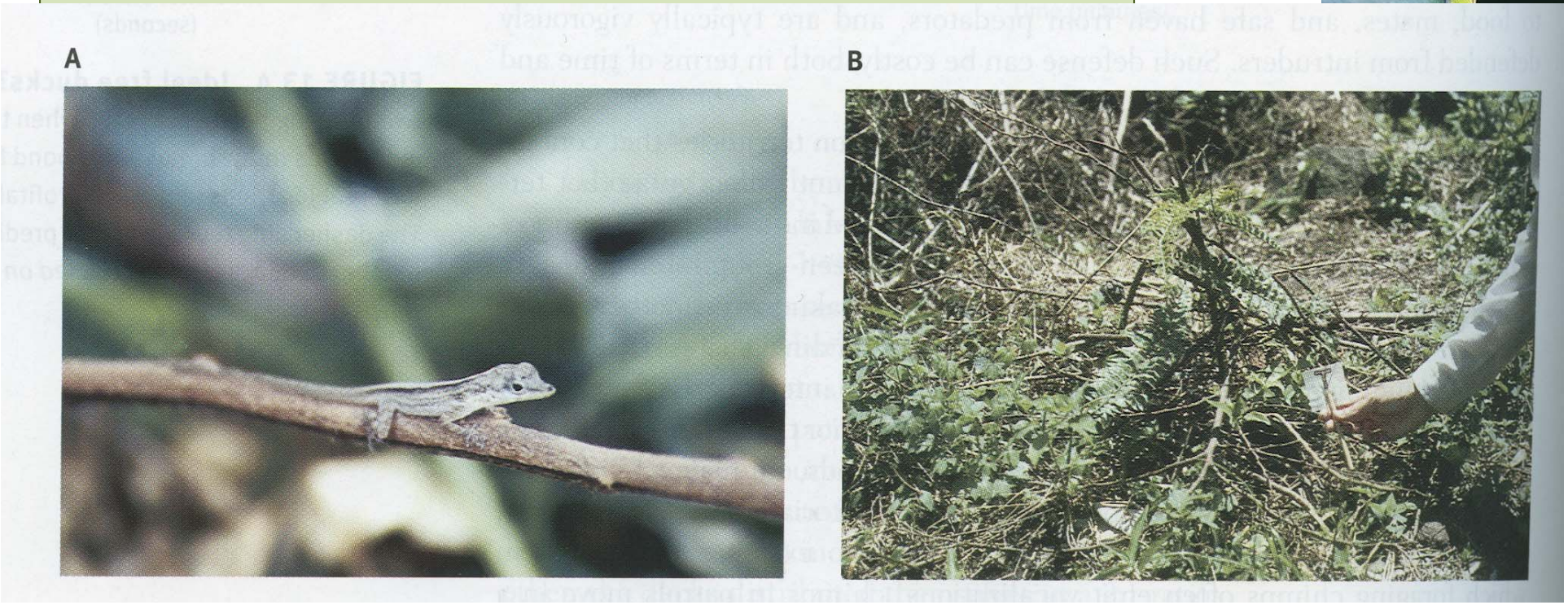
Habitat choose and Territoriality

1. The occupation and defense of particular areas.

2. Purposes of defending territory?

Territorial lizards: *Anolis aeneus*

1. Defend territory: suitable temperature; safety from predation



Decision making of *Anolis* lizards

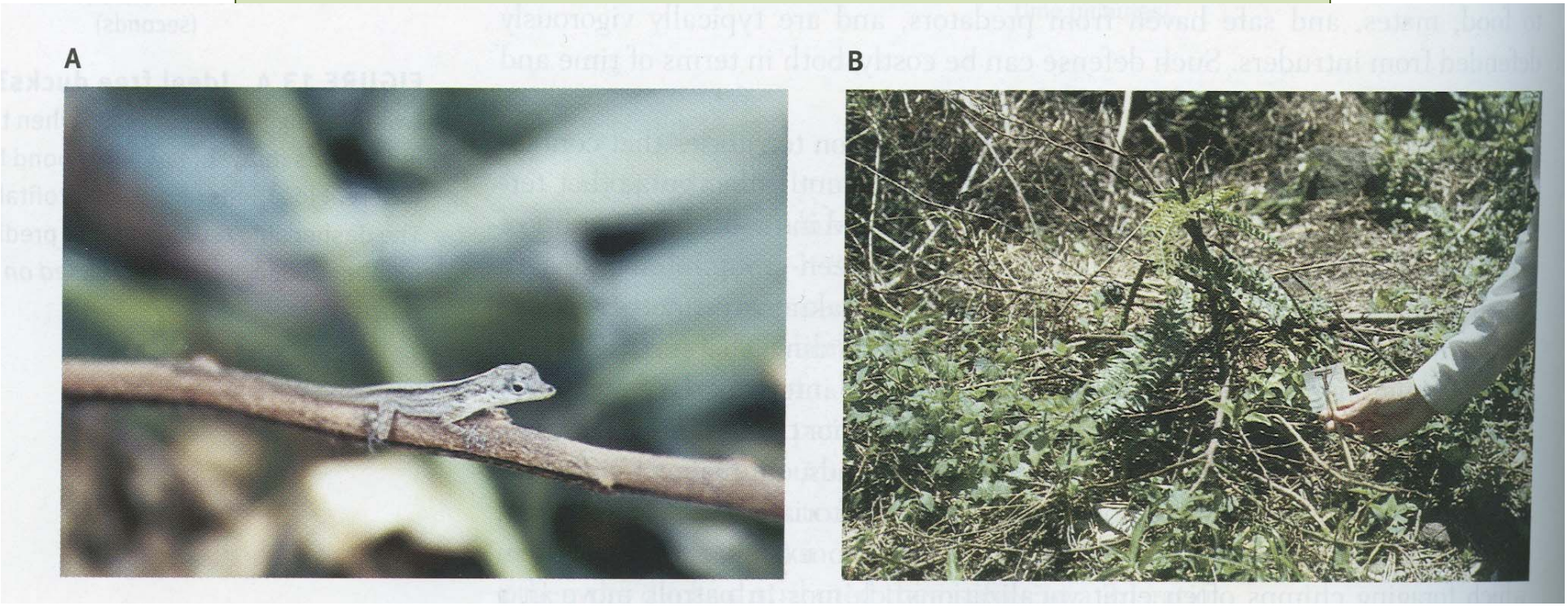
1. What territory to choose?

2. Juveniles seem to observe what other adults are doing…..

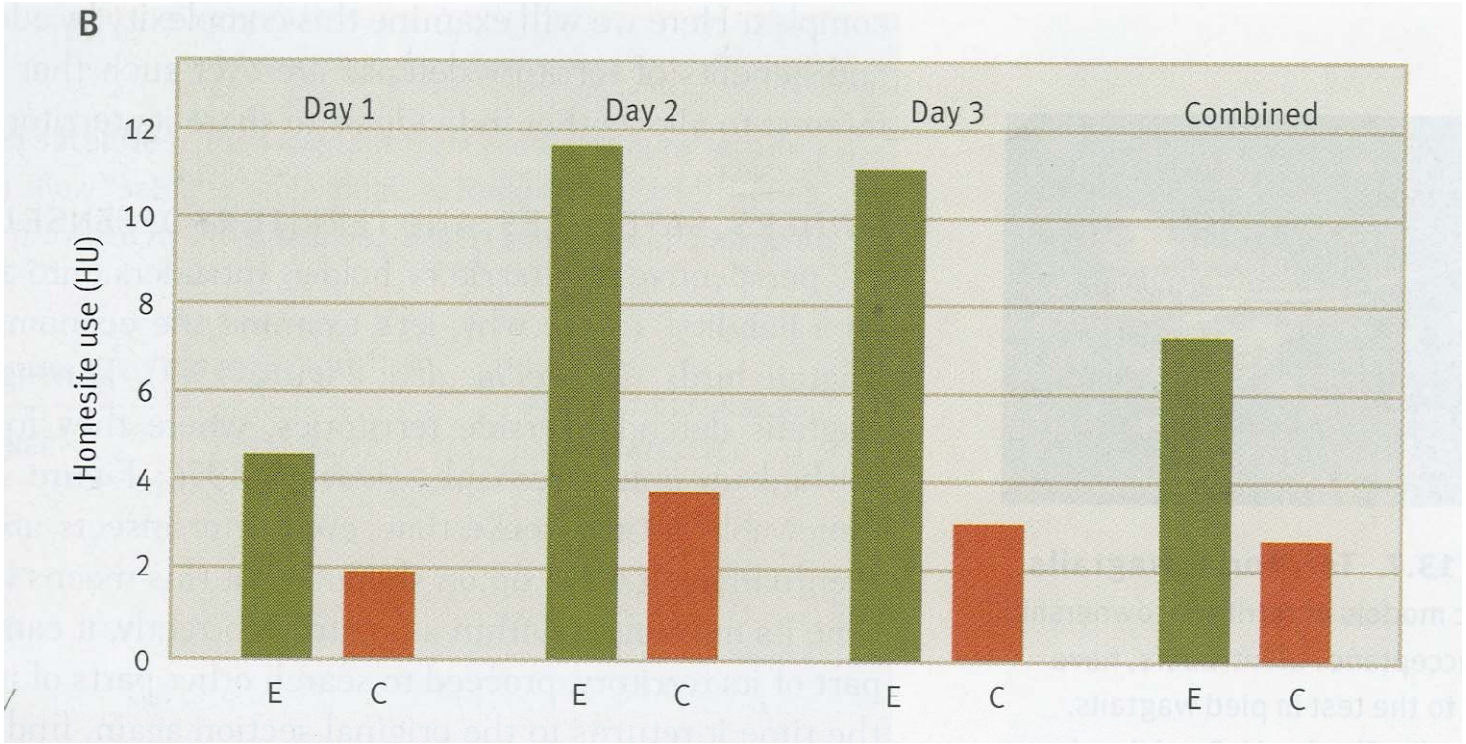
Hypothesis: Juvenile lizards learn to choose territory based on interacting with other adults.

Hypothesis: Juvenile lizards learn to choose territory by interacting with other adults.

1. How to test this hypothesis ?



Juveniles were allowed to observe and choose 2 territories (previously owned but vacant vs. not previously owned)



Furthermore, juveniles were not allowed to observe these two vacant territories before choosing it.

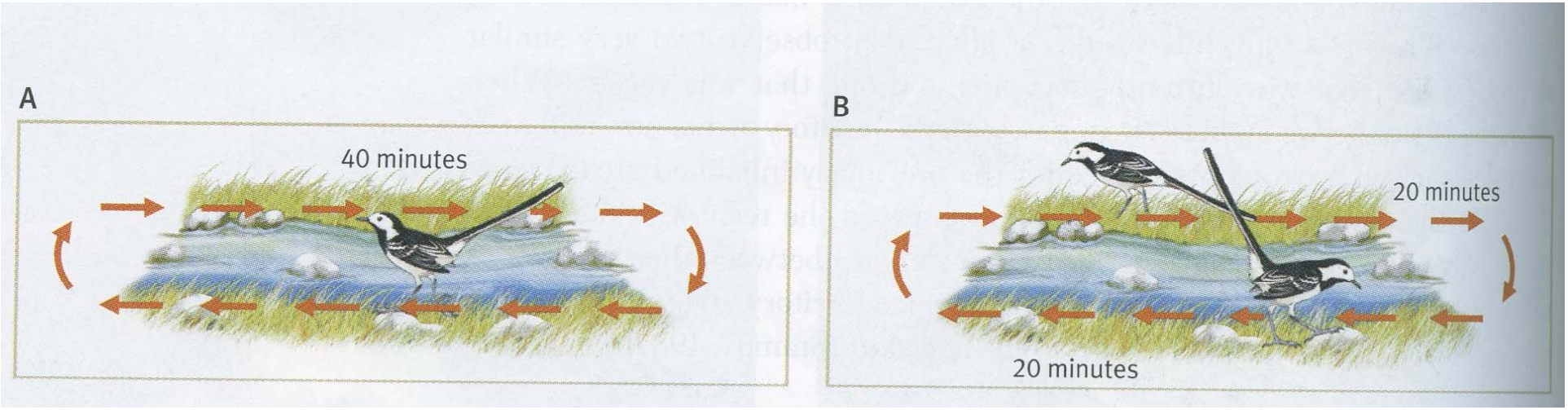
juveniles did not choose the one previously owned.

Suggest juveniles learn and observe from adults.

Sometimes territory owners allow satellites

1. Winter territory defense in Pied Wagtails

Decision making:
allow satellites or not?



Decision making: allow satellites or not?

1. Hypothesis: decision could be based on food abundance.

2. This is an example of ….

   mutualism

Other examples of decision making in animals?

Aggression

1. Model of Aggression

2. Proximate mechanisms of Aggression

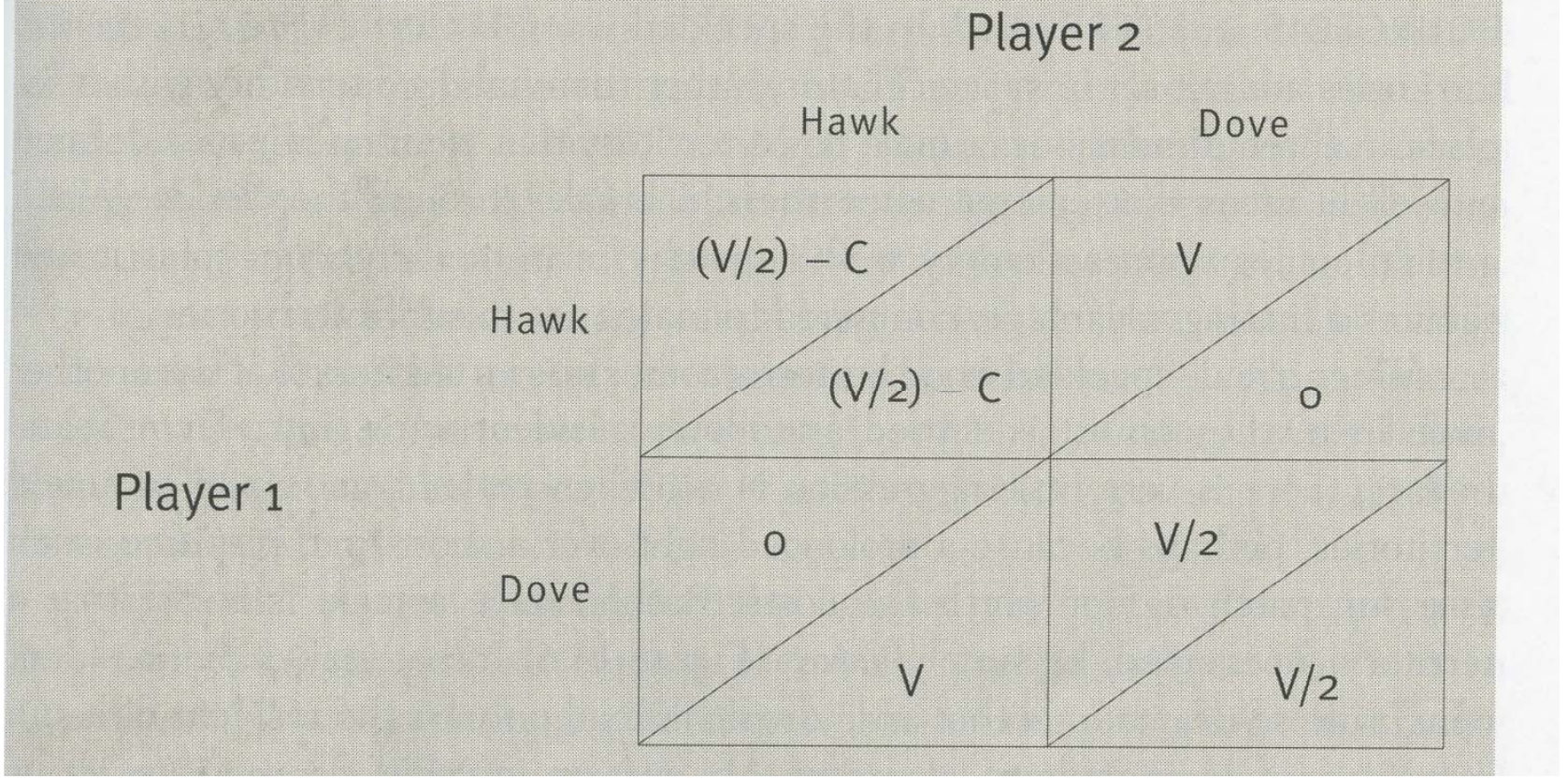
Model of Aggression

Game theory

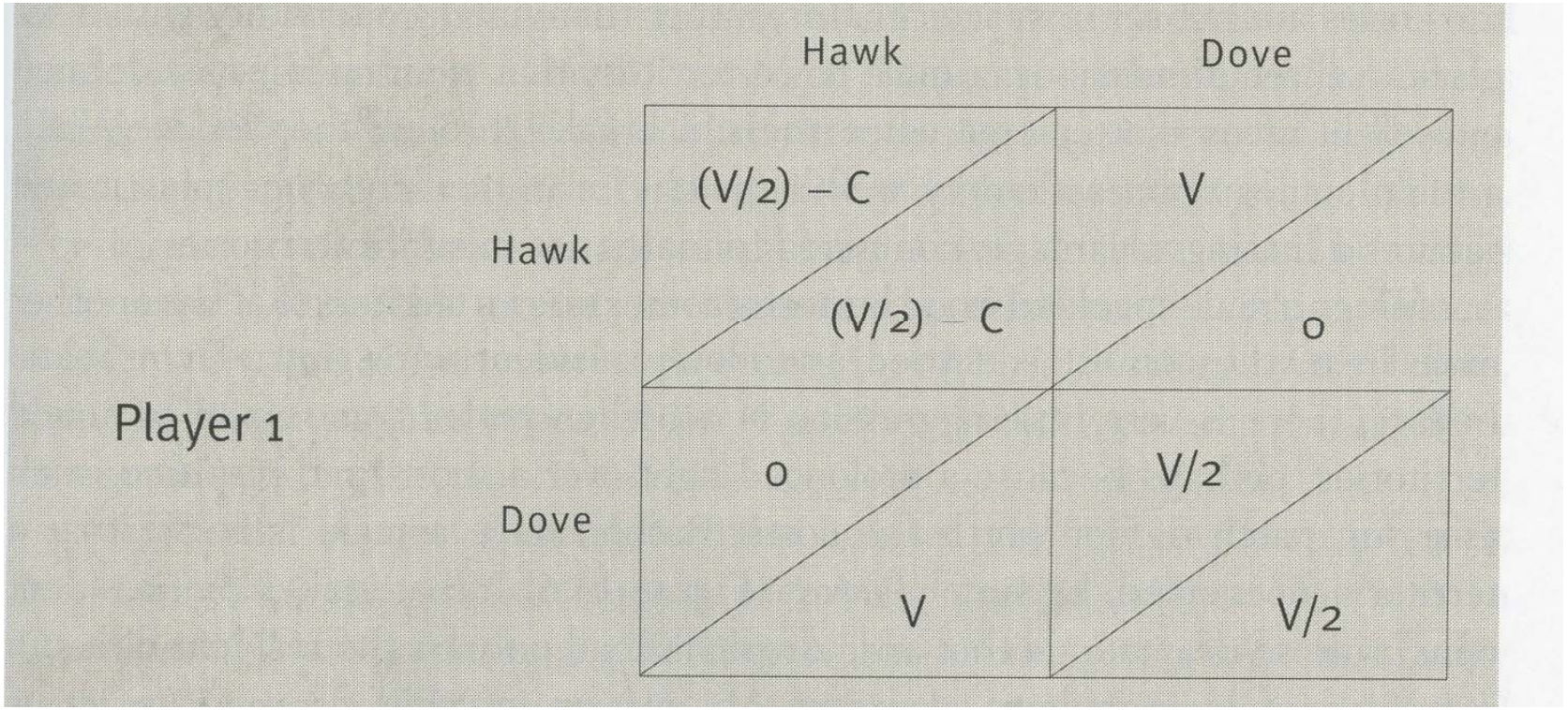
The hawk-dove game

Hawk-Dove game

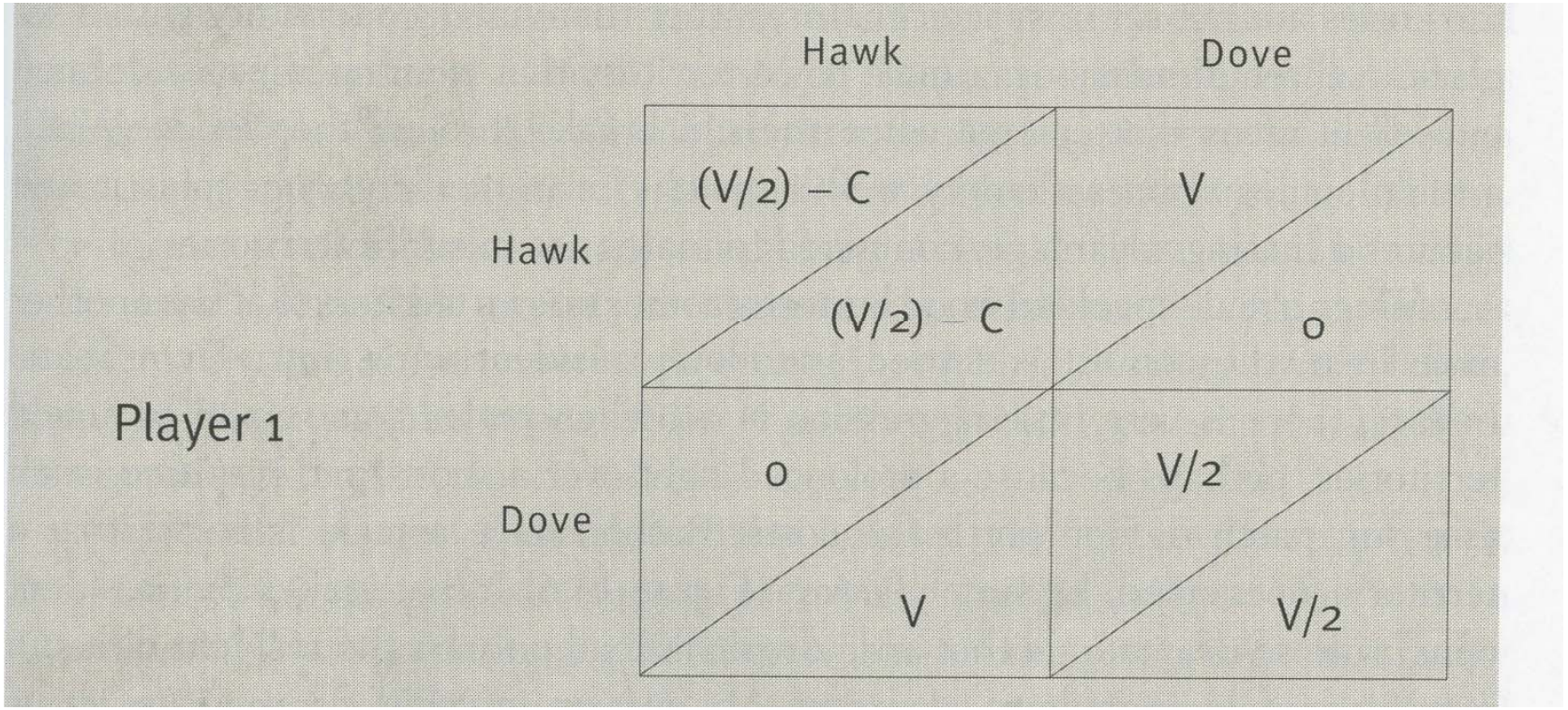
TABLE 14.2. The payoff matrix for the hawk-dove game. Both player 1 and player 2 choose between the hawk (always be aggressive) strategy and the dove (bluff, but retreat if opponent escalates) strategy. V = value of resource, C = cost of fighting. Payoffs to Player 1 are shown above the dashed line, and payoffs to Player 2 are shown below the dashed line.



This game strategy evolves depends on the value of the resource (V) or cost of fighting (C) is greater



If V> C, then Hawk is an evolutionary stable strategy:
V/2-C >0;
V/2<V (not as good to be a dove)



Bourgeois strategy

Individual to play hawk if it is a territory holder;

Individual to play dove if it does not own a territory

Bourgeois strategy (Speckled wood butterfly)

M1 (experimentally made a territory owner) always defeated an intruder male, M2.

If M1 was removed from his territory, M2 occupied it for a while, M1 would now defer to M2

Aggression

Proximate mechanisms: hormone

During fight-or-flight response:

1. Adrenaline and norepinephrine surge in blood sugar, and oxygen are delivered to the brain, muscles, and heart

2. Non-essential systems, digestive and reproductive system, temporarily shut down

3. Evaluate the cost and benefit of fighting.

Proximate mechanisms: hormones

Dominant individuals: increased androgen level, more likely to fight than flee.

Subordinate: more likely to flee than fight; have higher circulating levels of glucocorticoid "stress" hormone when going into fights.

Serotonin, aggression and social status

In crustaceans (lobsters)

Increased serotonin →

Enhanced aggression →

Higher social status

Serotonin, aggression and social status

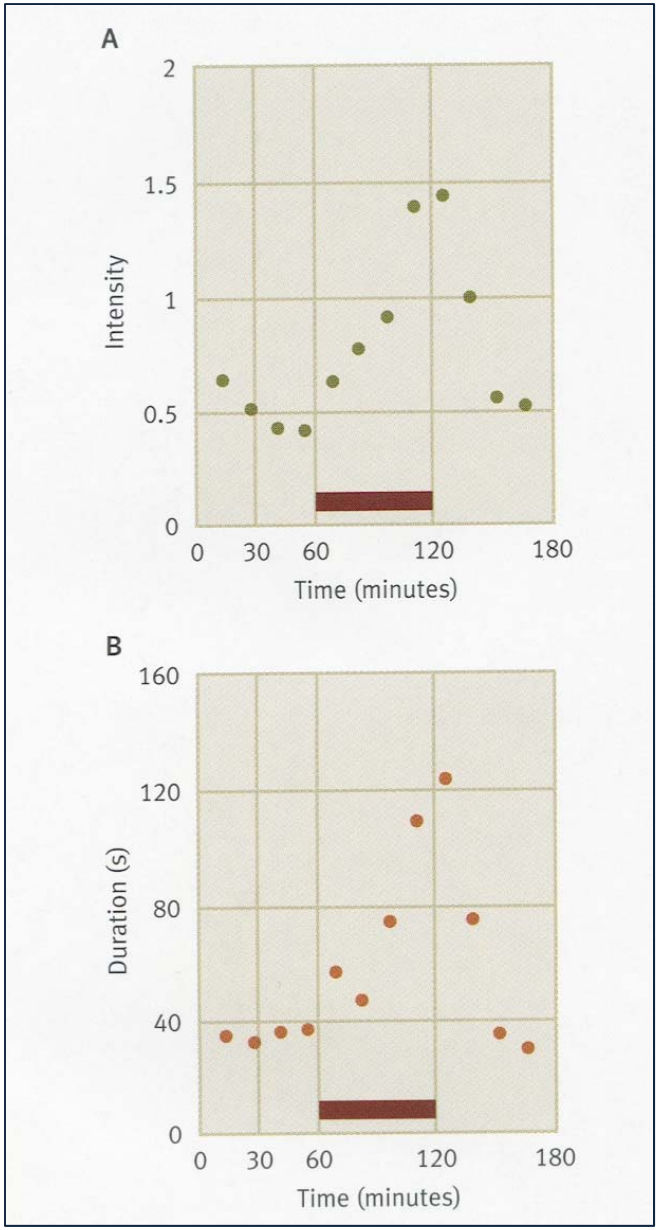
In lobsters

Loser in fights → low serotonin

Avoids aggressive interactions →

Inject serotonin → more aggressive

Inject Prozac (serotonin inhibitor)
→ aggression disappears



Proximate mechanisms: hormones

For a territorial holder: tend to have high level of stress hormones (glucocorticoid).

The dominant male (in a hierarchy) are often challenged by many subordinates:
unstable social hierarchy
high level of stress hormones.

Stressful social ranks

Higher levels of stress hormones

Lower immune system against pathogens

Reduced number of synapses;
Reduced number of neurogenesis;
Physical/ mental health deterioate…

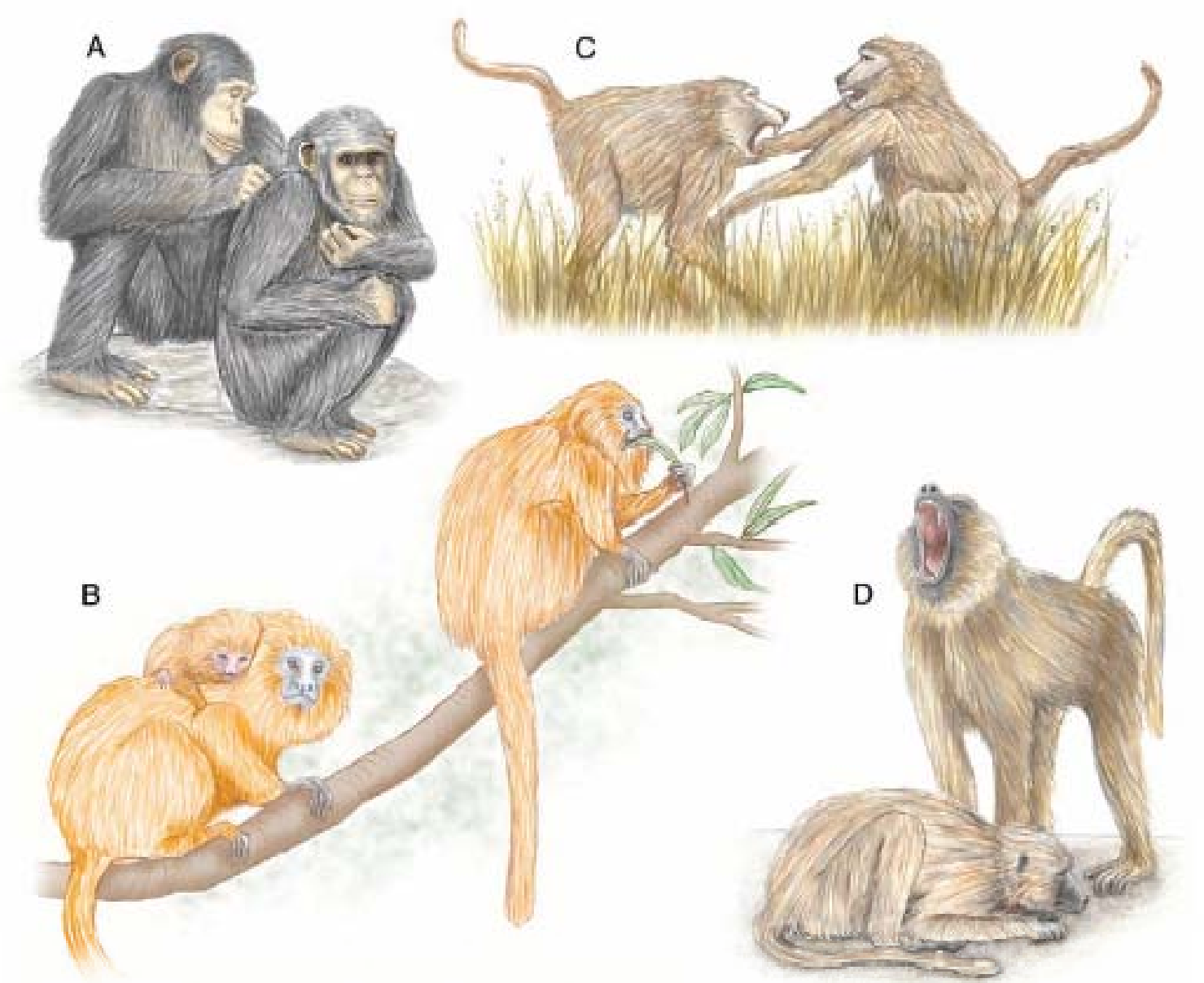


Fig. 1. (A and B) Affiliative behavior among subordinates can reduce the effects of stress. (A) Chimpanzees engage in social grooming. (B) A female tamarin monkey cares for another's young while the mother feeds. (C and D) Stressful dominance behavior may take physical or psychosocial forms. (C) Male savanna baboons may fight over a kill. (D) A dominant male baboon intimidates a subordinate. [Image credit: Carin Cain/Science]